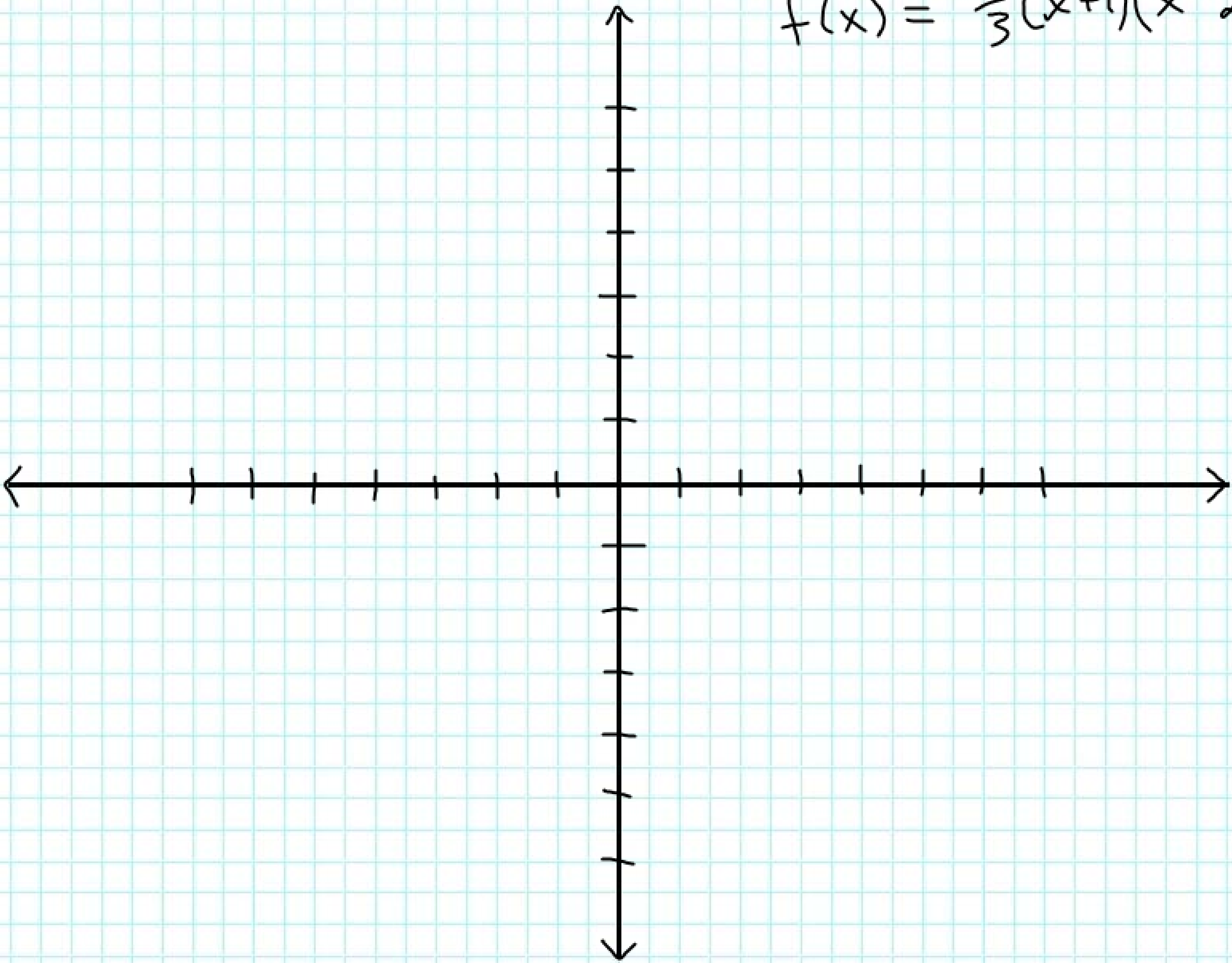
① Use Descarte's Rule of Signs (p.120) to determine the number of possible positive and negative real zeros of the function $f(x) = 2x^4 - x^3 + 6x^2 - x + 5$

② Use synthetic division to verify the upper & lower bounds (p.121) of the real zeros of $f(x) = 2x^3 - 3x^2 - 12x + 8$

upperbound $x = 4$ lowerbound $x = -3$

③ No calculator, sketch a graph of $f(x) = -\frac{1}{3}(x+1)(x-2)^2$

$$f(x) = -\frac{1}{3}(x+1)(x-2)^2$$



Work in groups to answer questions on HW for 2.3 + 2.4

So far...

p. 101 Even/odd functions

p. 101 Leading Coefficient

p. 104 Even/odd Multiplicity

p. 107 Intermediate Value Thrm.

p. 112 Long $\div$ of polynomials

p. 115 Synthetic division

p. 116 Remainder Thrm.

p. 118 Rational Zero Test

p. 120 Descarte's Rule of Signs

p. 121 Upper/lower bounds

Sect. 2.4 Imaginary Numbers

Find the zeros of each polynomial

1. $f(x) = x^4 - 5x^3 + 15x^2 - 45x + 54$

2. $f(x) = x^4 + 2x^3 + 10x^2 + 18x + 9$

3. $f(x) = x^5 + x^3 + 2x^2 - 12x + 8$

4. $f(x) = x^3 + 4x$

5. $f(x) = x^4 - 3x^3 + 6x^2 + 2x - 60$
   if $1+3i$ is a zero

Tools

- Rational Zero Test
- Intermediate Value Theorem
- Upper/lower bounds
- Descarte's Rule of Signs

Today's Topics

p. 135 Fundamental Theorem of Algebra

p. 135 Linear Factorization Theorem

p. 137 Complex Zeros occur in conjugate pairs

p. 137 Factors of polynomials

HW

sect. 2.5 #

Watch for situations like these:

- $x^4 + 10x^2 + 9$ → like $x^2 + 10x + 9$ → so $(x^2+9)(x^2+1)$
  $(x+9)(x+1)$
- $x^2 - 25$ → Difference of Squares → so $(x+5)(x-5)$
- $x^4 - 625$ → Difference of Squares → so $(x^2+25)(x^2-25)$